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Praxeology and Space Syntax: An epistemological articulation in favor of urban mobility as human action

Praxiologia e Sintaxe Espacial: Articulação epistemológica em favor da mobilidade urbana como Ação Humana

Praxiología y Sintaxis Espacial: una articulacción epistemológica en favor de la movilidad urbana

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Palavras-chave:
Sintaxe Espacial; Praxiologia; Mobilidade Urbana; Infraestrutura.

RESUMO
O objetivo deste artigo é identificar a praxeologia como um método para estudos que visam trazer soluções para a mobilidade urbana. Neste sentido, o presente artigo procura conectar a praxeologia com a teoria da sintaxe espacial. Pois a Teoria da Sintaxe Espacial entende os espaços urbanos como um produto das interações humanas, e estes são tratados pela lógica individual de seus interesses e pela dinâmica humana dentro das áreas urbanas que podem diferir do que foi originalmente planejado.

Keywords:
Space Syntax; Praxeology; Urban Mobility; Infrastructure.

ABSTRACT
The purpose of this paper is to identify the Praxeology as a method for studies that aim to bring solutions to urban mobility. In these sense, the present article seeks to connect Praxeology with the Theory of Space Syntax. For the Theory of Space Syntax understands urban spaces as a product of human interactions, and these are treated by the individual logic of their interests, and human dynamics within urban areas that may differ from what was originally planned.

Palabras clave:
sintaxis espacial; praxiologia, movilidad urbana; infraestructura.

RESUMEN
El objetivo de este artículo es identificar la praxiología como un método para los estudios que buscan traer soluciones para la movilidad urbana. Por lo tanto, el presente artículo busca conectar la praxiología con la teoría de la sintaxis espacial, porque la Teoría de la Sintaxis Espacial entiende los espacios urbanos como un producto de las interacciones humanas, y éstos son tratados por la lógica individual de sus intereses y por la dinámica humana dentro de las áreas urbanas que pueden diferir de lo que se fue originalmente planeado.

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INTRODUCTION

In the nineteenth century, the medieval towns set new records of population growth, propelled by the Industrial Revolution, remodeling the medieval town in the industrial metropolis that grows beyond its walls and bastions, such as Vienna in 1844 (Monte-Mór, 2006).

Figure 1: Vienna 1844

Source: Medeiros (2013, p.59)

Insofar as the available technologies made possible greater distances to be occupied and the access time to the center of the city to remain constant, the question of how to offer the infrastructure (transportation, sanitation, etc) to support the volume of new inhabitants deserve attention. It contributed to the emergence of the first urban planners at the end of the 19th century, among these forerunners of Ildefons Cerdà (Spain), Ebenezer Howard (United Kingdom), Georges-Eugène Haussmann (France), and Patrick Geddes (Scotland) each one with his vision of what and how to plan.

In the beginning of the 20th century, a great concern was expressed in the physical design of the new cities, indicating how they should be - such as the Radiant City of Le Corbusier and the Industrial City of Tony Garnier - further strengthening the static aesthetics of the city to the detriment of the people (Saboya, 2007).

The commonalities of the various conceptions that guide modern city planning are the injunction of specific areas for each city activity: residential neighborhoods, industrial districts, well-defined green areas, and low population density, increasing the need for greater displacements within the city. To solve this problem, speed assumes its protagonist role in the history of the cities: wider streets, with more lanes, and great viaducts. Gehl (2015)[a] pointed that this desire to build the ideal city eventually alienated people from the city and destroyed the city's economy.

1 CRITICISM OF CITY PLANNING

Jane Jacobs (1916-2006) stood out as a great critic of the model of urban planning that materialized in the American cities, from the second decade of the twentieth century, cities that, like most of the modern cities, had great influence of the conceptions of Howard and Geddes.

> Planners, architects of city design, and those they have led along with their beliefs are not consciously disdainful of the importance of knowing how things work. On the contrary, they have gone to great pains to learn what the saints and sages of modern orthodox planning have said about how cities ought to work and what ought to be good for people and businesses in them. They take this with such devotion that when contradictory reality intrudes, threatening to shatter their dearly won learning they must shrug reality aside (Jacobs, 1961[a]).

Jacobs' notes do not suggest a criticism of city thinking, but rather the perspective of deciding how cities are and should be. The more centralized the decision of the city as a whole, more the vicissitudes of people's daily lives are neglected, and the individual behavior of how people act is not considered - quite the contrary, people are told how they should act to fit into the new planning.

Strengthening this view of seeing the city as part of a composition of people, Vanderbilt (2008) points out that traffic flow, although mathematically, it may seem like an independent entity, it is made up of people who have their own reasons for going where they are going. Traffic solutions are adopted in favor of the flow itself to the detriment of people who are removed from the city and need to understand, in a taxing way, how the flow works, and fit the new standard.

For Gehl (2015)[b], regardless of the economic development conditions of cities and the different problems with urban mobility, the pattern of neglect about the human dimension has appeared in all city planning in recent decades: the dramatic increase in automobiles as well as the urbanistic ideology of modernism. It separates the use of the city and highlights individual and autonomous buildings, and it would put an end to the urban space and city life, resulting in lifeless cities emptied of people.

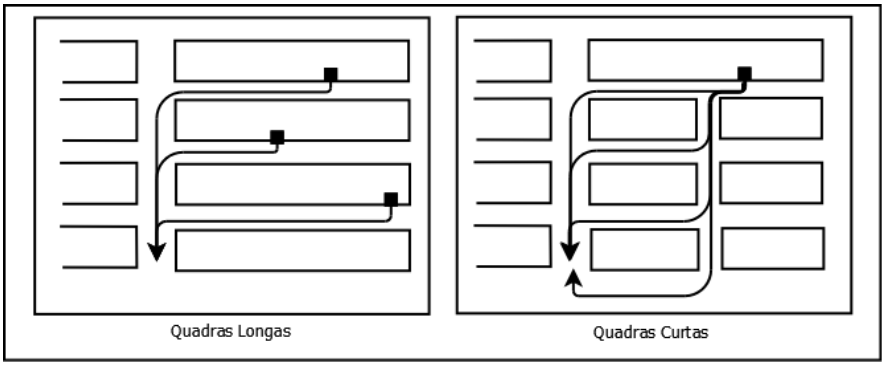
Jacobs (1961[b]) emphasizes four critical points for the resumption of people's participation in the urban fabric, which are "essential for there to be 'exuberant' diversity in the streets in urban public spaces, which favors its use, thus generating flows and security" (BARROS, 2014[a], p.18):

- The district must serve more than one primary function;
- Most blocks must be short;

- The district must mingle buildings that vary in age and condition;
- There must be a sufficiently dense concentration of people;

These points, signaled by Jacobs (1961[c]), are neither functional stages, nor independent: they represent a combination of interdependent actions that have the urban morphology as the central point. The existence of short blocks as a morphological factor, for example, increase the potentiality of the movement and thus generate great social effects in improving the life of the city. The size of the blocks directly interferes with the possibility of paths, because "smaller blocks make the mesh more articulated, which provides more paths for the displacements, be they of pedestrians or vehicles" (Barros, 2014[b], p. 20).

Figure 2: Possibilities of paths on long blocks and short blocks



Source: adapted form Jacobs (1961)

As an example, the comparison between paths within a long block idea, Figure 3 and another between short blocks, Figure 4.

Figure 3: Brasília (Brazil): SQN 215

Source: GoogleMaps

Figure 4: Rome (Italy): Piazza Navonna and Panteon

Source: GoogleMaps

Figure 3 shows the possibilities of a person leaving a dwelling of SQN 215, Block J (point A) and moving to the nearest shop, a convenience store in a gas station (point B) - the linear distance between point A and point B is 153 meters, but the route using the street is 500 meters. In addition to having a single route option, it has a labyrinth-shaped path, making it difficult for people to perceive space. Another point to be observed is that the option to enter and leave the super-block is unique for all inhabitants of the blocks within this block, which, by the way, is a block with only residential use, with only one type of land use. The planning guided by the ‘super-blocks’ totally ignored the perspective of the people, giving preference to large scales and big distances, a phenomenon to which Gehl (2015)[c] created the nickname of 'Brasilia´s Syndrome', a style that has spread the world since the foundation of the federal capital of Brazil, in 1956.

In contrast, Figure 4 is the illustration of a region in the center of Rome (Italy), with Piazza Navona as point A and the Pantheon as point B. These two points were chosen as a representation of short blocks and the distance between point A and B is also 500 meters, as in the example of Brasilia. However, there is a real range of different route possibilities. Besides drastically reducing the pressure for infrastructure in the only possible way, along the various routes, there are also diverse uses such as hotels, pizzerias, churches, museums, residences. This diversity of uses caused by the accessibility and the options made possible by the integration of short blocks, is what makes a city, economically active and livable.

Another criterion of analysis is urban density, which in larger blocks of cities planned in large scales is low, and reduces the economic activity of the cities. It is good to understand that the big flow of cars, that runs through the city from the suburb to downtown is quite different from a flow caused by the high activity within the city.

> Most consumer enterprises are just as dependent as parks on people going to and for throughout the day, but with this difference: if parks lie idle, is bad for them and their neighborhoods but they do not disappear as a consequence. Id consumer enterprise lie idle for much of the day they may disappear (Jacobs, 1961, p.153).

Higher densities in places with more uses and routes optimize urban life and further enhance the sustainability of the city as a whole, for companies and their inhabitants. Being sustainable is to keep the city alive.

2 MOBILITY AND AUSTRIAN ECONOMICS: EPISTEMOLOGICAL CONVERGENCES

The foundations of the critics of urbanist authors reverberate in other areas that epistemologically commune with important points to provide the solution that cities need, especially in the city's economy. Even though economic science, as well as urbanism, has several currents concerned with solutions constructed in macro plans, some of them formulate their axioms considering the existence of individuals as individuals who act and that their behavior is important for economic decisions.

Around 1870, the Marginalist Revolution, which inaugurated the modern economy had in one of its protagonists Carl Menger (1840-1921) - who created the subjective theory of value by giving to the economic analysis a teleological, somewhat humanistic value. It defined the economy as the study of the purposeful choices of human beings and their ability to relate events and facts to their final effect (Klein, 2007, p. 2)

Rothbard showed that evaluation from the individual standpoint is the cornerstone of economic theory, because “fundamentally, economics does not deal with things or material objects. Economics analyzes the logical attributes and consequences of the existence of individual valuations” (Rothbard, 1956, p. 256). This economic point of view is that it converges with the urbanist view that considers mobility a result of human actions.

It is necessary to understand that people living in cities act and think as individuals when it comes to defining where to go, how to go and what to do during their journays. Above all, they are human beings and not computers that use algorithms to define how to plan their day.

> The answer is by understanding my motives and interests, my convictions and aspirations, my normative orientations, and my concrete perceptions resulting in this action. (Hoppe, 1995, p.34)

In fact, human action is the foundation that guides Praxeology as a scientific method, and L.V. Mises was assertive in identifying human action as an axiom capable of making economic science a part of Praxeology, since it depends on a logic of action. Praxeology becomes suitable for application in the study of urban mobility, since it is a science that studies the individual actions of men. L.V. Mises points out that "in the further course of its inquiries that cognition of human cooperation is attained and social action is treated as a special case of the more universal category of human action as such" (Mises, 1998, p.54). So, it is correct to point out Praxeology as an adequate science to study the behavior of society, for it results from the cooperation of the action of individuals.

All the failures of urban planning conceived and implemented in the last fifty years have their origin in two factors: (i) lack of understanding that the urban economy is a product of the urban mobility, and not the other way around; (ii) total disregard of human action and its dynamics, which moves the city as the generator of this mobility, whether it is the city of developed economy or developing countries.

No doubt the best example of epistemological convergence between authors dealing with economics and urban mobility is the case of F.A. Hayek (1899-1992) and Jane Jacobs.

> Yet all those who are fascinated by the beautiful plans which result from such an approach because they are 'so orderly, so visible, so easy to understand' , are the victims of the synoptic delusion and forget that these plans owe their seeming clarity to the planner´s disregard of all the facts he does not know (Hayek, 1973, p.74).

The abandonment of the city life tradition that Gehl (2015) points out is intrinsically linked to the action of the economic agents who construct the dynamics of cities and who were suddenly rearranged, but are capable of creating a different reaction from that expected by the planners. Explosive growth occurs just like a dam that breaks up and the volume of distinct reactions between economic agents cause problems like mass transit traffic and overcrowding.

Many people treat these criticisms of planning as an ode to chaos, in the sense of disorder and lack of control, with babelic intentions. However, Jacobs' thinking and the praxeological economists emphasize that there must be conditions for people within a social organization – cities, neighborhoods and districts – to have choices, because "this very fluidity of use and choice among

city people is precisely the foundation underlying most city cultural activities and special enterprises of all kinds" (Jacobs, 1961, p. 115).

3 SPACE SYNTAX

The spatial syntax, or urban syntax, refers simultaneously to a theory, a methodology and a tool that proposes to investigate the relationship between the socioeconomic phenomenon of cities and their spatial configuration (Rodriguez Dias and Sakr, 2014). The epistemological framework of this methodology was the publication of The Social Logic of Space in 1984 by Professors Hillier and Hanson of University College London (UCL).

For the spatial syntax, there is a deep relation between cause and effect of the use of space as the product of human interactions in the human dynamics that live in these spaces, which may be different from the dynamics established by city planners (Hillier et al., 1993[a]). This theory allows us to work with the perspective of human relations and its vision of the city as the cause of flows, rather than the opposite, as proposed by traditional traffic engineering, which seeks to allocate people to the optimal choice of source-destination. Contrary to traditional traffic engineering proposals, the spatial syntax perspective relies on the role of the configuration as the generator of the flow, not as a consequence of it. The configuration shapes the flow, and thus, the flow is the consequence of the configuration.

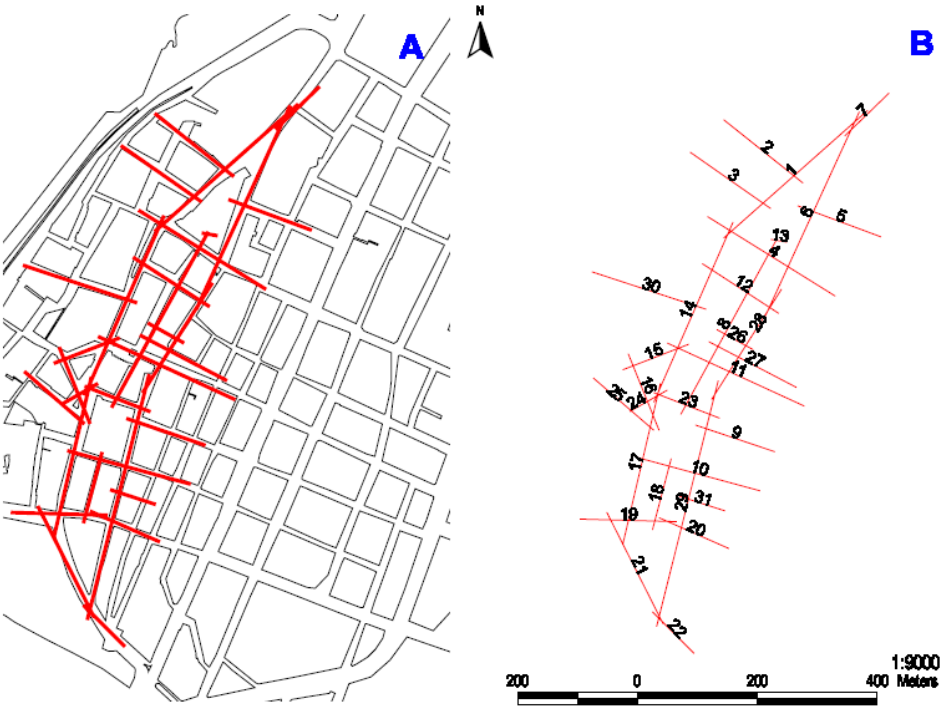
> Configuration may influence the location of attractors, but the location of attractors cannot influence configuration. Likewise, configuration may influence movement but movement cannot influence configuration (Hillier et al, 1993[b], p.31).

The Spatial Syntax analysis technique allows the identification of flow potentiality within a specific urban space (Barros et al., 2008). Do Carmo et al. (2013) points out that the basic elements of this technique are the convex space and the axial line, which allow the spatial syntax methodology to understand the urban space. The lines present the two key properties of being both very simple and global. All we need to know is how much we can see from a point (Hillier, 1996). The analysis of this combination corroborates the construction of Axial Maps that seek to be the linear representation of the network of paths, illustrating the potential of generation of movement in each pathway. The axial map of an urban grid consists of the longest and fewest straight lines that can be drawn through the spaces of the grid so that all the grid is covered (Hillier et al., 1993[c]).

This linear representation of the axial map allows the construction of a matrix of connections that undergoes the Synthetic Analysis of Space it is possible to "measure, quantify and

hierarchize differentiated levels of connections between each path and the complex where it is inserted" (Medeiros, 2013[a], p.152). This hierarchy occurs by the identification of the axes with great potential of flow, comparing the axes with the lowest potential of flow.

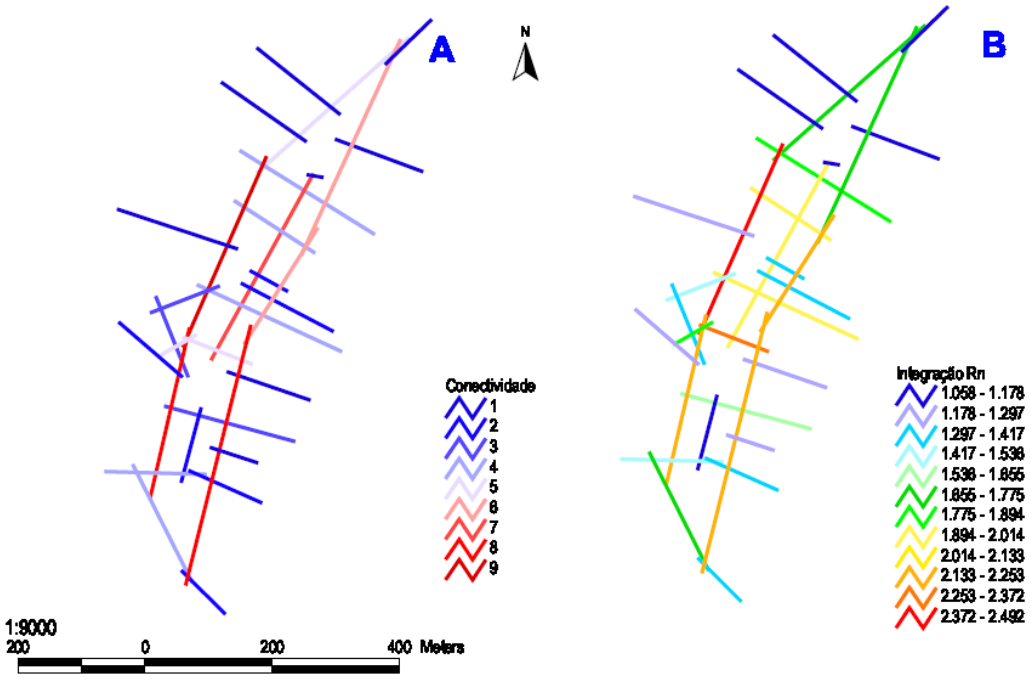
Figure 5: Axial Map



Source: Medeiros (2013)

The possibility of the flow of movement within the urban mesh, suggested by the influence of the integration of lines that relate to the whole system, demonstrates how permeable that space is, and in contrast, the existence of barriers (buildings, blocks, rugged terrain) reduce the accessibility and possibility of flow in this space (Medeiros, 2013[b]). Influencing the choices of the displacements "give this system a kind of probabilistic field in which it is possible to point out the most probable potential routes to be traveled"(Pereira et al, 2011, p.10). Integration will play a key role in the choice of specific road axes within the urban network, since more integrated axes are those that are more permeable and accessible in urban space, where others are easily reached. When the entire depth map of each axis is observed systemically to reach all the axes of the system, the average depth of this system is found; the more "shallow" a system is, the lower the mean depth is, the higher the mean depth we can identify a labyrinthine system with low integration (Loureiro, 2016). The most integrated lines we can represent with warm colors; the least integrated, cold colors.

Figure 6: Connectivity & Integration



Source: Medeiros (2013)

Analyses of these axial maps will play an important role in understanding the behavior of people's movements, making it possible to identify the impact that interventions in the urban fabric can have in the increase of integration between the axes, reducing the depth caused by the fragmentation of the mesh. For Medeiros (2013)[b], fragmentation of the urban grid, discontinuity and interstitial voids in the road network lead to less system intelligibility. More intelligible systems have well-connected and more integrated lines. Bandeira (2005) adverts that intelligibility helps to identify the importance of specific lines within a road system, since it reveals the difficulty or easiness that individuals have in orienting themselves and finding themselves in the system.

FINAL CONSIDERATIONS

Authors like Jane Jacobs and F.A. Hayek present a diagnosis of the social conditions caused by the excesses promoted by central planning. As a tool to measure such an impact, the result of the application of Spatial Syntax with the use of axial maps allows us to understand the logic of the movement within the cities from the perspective of the individual who experiences the urban life. This vision of the city, which differs from the current forecast strategies for destination source flows, may present more consistent results, since it allows us to see how the probable behavior of people's movement in the urban network occurs. And consequently, make possible to

identify how new interventionist urban models alter people's conception of the new design and thus predict how these modifications will influence the likely new behavior of this movement. Bringing together all the ideas presented, the Jane Jacobs anti-planner idea, Mises praxeological method, and Space Syntax tool, it is possible to create an epistemological articulation in favor of urban mobility, by starting to create cities for people, in light of human action.

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